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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/853,345

05/10/2001

Robert Edward Fontana JR.

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05/21/2004

LUMEN INTELLECTUAL PROPERTY SERVICES, INC.  
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EXAMINER

MCPHERSON, JOHN A

ART UNIT

PAPER NUMBER

1756

DATE MAILED: 05/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 09/853,345	Applicant(s) FONTANA ET AL.	
	Examiner John A. McPherson	Art Unit 1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 25 February 2004.  
 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.  
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 32 and 34-45 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
 6) ☒ Claim(s) 32 and 34-45 is/are rejected.  
 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) ☐ All    b) ☐ Some \*    c) ☐ None of:  
     1. ☐ Certified copies of the priority documents have been received.  
     2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
     3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Response to Amendment***

1. This Office Action is responsive to the Amendment filed 2/25/04
2. The Amendment filed 2/25/04 successfully overcomes the rejections set forth in paragraphs 3-8 of the Office Action dated 1/29/04. Accordingly, these rejections are withdrawn.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 32, 35-37, 39 and 44 are rejected under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over JP 2001-043515 (JP '515). JP '5151 discloses a method of forming a mask pattern in a process of manufacturing a thin magnetic head comprising the steps of forming a first resist comprising PMGI on a substrate provided with a magneto-resistive film, forming a

second electron beam resist on the first resist, forming a latent image in the second resist, developing the second resist with a developer which hardly dissolves the first resist layer to form an upper layer mask pattern, removing a part of the first resist layer with a developer which hardly dissolves the second resist layer to create a bridge portion from the upper layer mask pattern, and ion etching the magneto-resistive film to easily form an element having a line width of 0.5 microns or less. See the abstracts, and paragraphs [0040]-[0057] and [0120] of the computer-generated translation. Accordingly, because the disclosed line width (0.5 microns or less) includes the claimed width range of the present invention (narrower than 0.2 microns), this invention is not novel.

Alternatively, while JP '515 does not exemplify an embodiment having a width in the lower portion of the disclosed range, so as to be within Applicant's claimed range, it would have been obvious to one skilled in the requisite art to minimize the line width within the given range so as to arrive at a width of less than 0.2 micrometers, since it has been held that discovering an optimum value of a result effective variable (track width is known to effect the obtainable recording density) involves only routine skill in the art (*In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA)), and it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (*In re Aller*, 105 USPQ 233).

4. Claims 32, 35-41 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2001-043515 (JP '515). The disclosure of JP '515 is discussed

above in paragraph 3. Furthermore, JP '515 discloses that the first resist layer comprising PMGI is developed with an alkali (i.e. basic) developer. See paragraph [0050] of the computer-generated translation.

However, JP '515 does not disclose utilizing a basic developer for the first resist comprising NaOH or KOH, nor does JP '515 disclose a specific composition or developer for the second electron beam resist. The Examiner takes Official Notice that NaOH and KOH are known in the art as alkali developers for dissolving polymer resists. Additionally, the Examiner takes Official Notice that polymethyl methacrylate is known in the art as an electron beam resist material, and that a composition comprising isopropyl alcohol and water is known in the art as a developer for electron beam resists comprising polymethyl methacrylate.

It would have been obvious to one skilled in the requisite art to utilize NaOH or KOH as the alkali developer in the process of JP '511 because it is known in the art the these compositions are useful as alkali developers for polymer resists. It would have been obvious to one skilled in the requisite art to utilize a composition comprising polymethyl methacrylate as the electron beam resist, and to use a composition comprising isopropyl alcohol and water as the developer for this electron beam resist, in the process of JP '515 because it is known in the art the art that a composition comprising polymethyl methacrylate is useful as electron beam resists, and it is known in the art that a composition comprising isopropyl alcohol and water is useful as a developer for electron beam resists comprising polymethyl methacrylate.

5. Claims 32 and 35-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2001-240515 (JP '515) in view of the article "Chemistry of Ketal Resist System and Its Lithographic Performance" by Huang et al. (Huang). The disclosure of JP '515 is discussed above in paragraphs 3 and 4. Furthermore, JP '515 discloses that the resist for forming the mask pattern may be either an electron beam resist or a photoresist. See paragraph [0123] of the computer-generated translation. However, JP '515 does not disclose utilizing a deep ultraviolet resist as the material of the photoresist layer. Huang discloses that lithography has shifted from I-line to deep-UV wavelengths due to the requirement of printing 250 nm images or below, and provides a photoresist composition useful in the deep-UV region. See the first sentence of the article (excluding the abstract). It would have been obvious to one skilled in the requisite art to utilize a deep-uv resist, as taught by Huang, as the photoresist in the process of Katakura because it is taught that the photolithography art recognizes deep-UV resists are preferable to conventional, near UV photoresists when forming images of 250 nm or less.

6. Claims 32, 35-41 and 44-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2001-043515 (JP '515) in view of Applicant's discussion of the prior art in the specification. The disclosure of JP '515 is discussed above in paragraphs 3 and 4. However, JP '515 does not disclose forming a patterned MR layer having a trackwidth to thickness ratio of less than or equal to 4 to 1, or a thickness of the MR layer so that this ratio can be calculated. In the Background Art section of the

specification, Applicant states that significant reduction of the GMR layer thickness used in the prior art is not possible. See page 4, lines 24-26. Accordingly, the thickness of the GMR layer in the admitted prior art is the same as in the present invention, 0.04 to 0.06 microns (see page 8, lines 4-9). JP '515 discloses an element width of 0.5 microns or less. This would result in a calculated trackwidth to thickness ratio of about 10:1 or less, and this ratio would become smaller as the element width becomes less. The ratio would be approximately 4:1 for an element width of 0.2 microns.

It would have been obvious to one skilled in the requisite art to minimize the line width within the given range so as to arrive at a width of less than 0.2 micrometers, since it has been held that discovering an optimum value of a result effective variable (track width is known to effect the obtainable recording density) involves only routine skill in the art (*In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA)), and it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (*In re Aller*, 105 USPQ 233). It would have been obvious to one skilled in the requisite art to use a MR layer thickness of 0.04 to 0.06 microns, thereby arriving at trackwidth to thickness ratio of less than or equal to 4:1 (for a trackwidth of 0.2 microns), as the thickness in the process of JP '511 because it is taught that this is the minimal thickness of the MR layer in the prior art, as admitted by Applicant.

***Response to Arguments***

7. Applicant's arguments with respect to claims 32 and 35-45 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.


9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John A. McPherson whose telephone number is (571) 272-1386. The examiner can normally be reached on Monday through Friday, 8:00 AM to 4:30 PM.



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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



John A. McPherson  
Primary Examiner  
Art Unit 1756

JAM  
5/6/04